AN

ESSAY

ON THE

DISEASES OF THE BILE,

More particularly its

CALCULOUS CONCRETIONS,

CALLED

GALL-STONES.

By WILLIAM WHITE, F. A. S.

> Non fingendum, aut excogitandum, ſed inveniendum, quid natura faciat, aut ferat.
> BACON.

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PREFACE.

IT is ſurprizing, that ſo little mention is made in the writings of the moſt eminent authors, of the diſeaſe which is the ſubject of the following Eſſay.

Biliary calculi, or gall-ſtones, were altogether unknown to the ancients; but when the diſſection of morbid bodies became more general, they were frequently met with by anatomiſts in the three laſt centuries, but they ſeem to have had no idea of the ſymptoms attending their preſence in living ſubjects. Two of the moſt eminent phyſicians of our own country, Sydenham, and Mead, do not ſo much as make mention of them in their works; and the great Boerhaave only ſpeaks of them as being ſometimes the occaſional cauſe of a jaundice, though we are told that he particularly recommended this diſeaſe to the notice of his pupils.

The celebrated Hoffman, Dr Simſon profeſſor at St Andrews, and the Baron Van Swieten, firſt phyſician to the Emperor, give us ſome occaſional remarks upon this diſeaſe, but upon the whole, ſhort, and unſatisfactory. Dr Coe is the only one, as far as I know of, who has treated profeſſedly upon the ſubject of biliary concretions. His work is chiefly a collection of obſervations from other authors, he made no experiments upon the nature of the calculi, ſets out with declaring, he knows no method of diſſolving them, and conſequently places all his hopes of a cure in promoting their paſſage through the ducts into the bowels, and thence out of the body.

We are not to ſuppoſe this diſeaſe to be a new one, becauſe many eminent men have paſſed it over in ſilence. It has, no doubt, as Dr Coe obſerves, been miſtaken for an uncommon kind of cholic; for ſpaſms from an hyſterical, rheumatic, or gouty origin.

It is ſo far from being a rare diſeaſe, that it appears on the contrary to be a very common one; but ſeldom ſuſpected, unleſs the patient quits the ſtones; then indeed the diſeaſe is obvious.

vious. Dr Simſon believes the ſtone in the gall-bladder to be as frequent an occurrence as thoſe in the urinary paſſages. And Profeſſor Haller, at Gottingen, ſays, that the former is much more common than the latter, eſpecially at that place, and expreſſes his ardent wiſhes, that a method of cure might be diſcovered for ſo frequent, painful, and dangerous a diſeaſe. I have heard an eminent phyſician declare, that he believed few people were exempt from them, that they were generally the cauſe of diſorders of the ſtomach and bowels, and of the diſorders uſually called nervous; I have ſeen the event prove the truth of this opinion.

Authors who have treated of this diſeaſe, give us in general only the ſymptoms attending their paſſage through the biliary ducts; I have endeavoured to be more full in this part, to trace them from their firſt appearance, before the diſeaſe ſhews itſelf by more alarming and evident ſigns.

It muſt here be obſerved, that there are many inſtances of calculi voided by ſtool, which are of a real ſtony and gritty compoſition, reſembling the urinary ones; containing no bile in their compoſition, and like them ſoluble in a cauſtic alcali. Totally different from thoſe are the true biliary calculi, both as to texture, compoſition, and ſolubility. It is indeed doubtful whether the former comes from the biliary paſſages, they more probably are concretions formed in the pancreas, that viſcus having been found full of calculi; or formed in the inteſtines, there being many inſtances of large inteſtinal calculi of a ſtony or gritty texture, having a real gall-ſtone for their nucleus. The true biliary calculi are only here meant, and whoſe nature and compoſition are explained in the following eſſay.

I thought it not amiſs to begin with ſome general remarks upon the liver, not only to ſatisfy the reader not converſant with anatomy, but as the conſideration of its attachments enables us to account for many ſymptoms ariſing from ſtones in the gall-bladder.

AN
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DISEASES OF THE BILE.

OF THE LIVER.

IT will be unneceſſary here to enter upon a minute deſcription of this viſcus, it may not however be amiſs to mention its ſituation, connections, and uſe in the animal œconomy.

The liver is a large and pretty ſolid glandular maſs, of a dark red colour, inclined to yellow, ſituated partly in the right hypochondrium, which it nearly fills up, and ſtretching acroſs under the appendix enſiformis, or pit of the ſtomach, between it and the ſpine of the back, it terminates in the left hypochondrium, into which it runs in ſome ſubjects a conſiderable way.

In its healthful ſtate, it is covered intirely by the ribs, except where it paſſes under the pit of the ſtomach, in which part it is only covered with its own proper membranes, the abdominal muſcles, and the common covering of the body.

Hence it may be eaſily felt in that part, when the body is put in a proper poſition for relaxing the abdominal muſcles.

Its figure is irregular, being convex on the upper part, and unequally concave towards the back.

Its convex ſide is connected to the diaphragm by three ligaments. One at the extremity of each lobe, and one in the middle. The right ligament frequently connects the great lobe to the cartilages of the falſe ribs; the middle one is fixed to the rectus abdominal muſcle. Beſides theſe ligaments, the great lobe of the liver is alſo connected to the diaphragm by a broad and immediate adhæſion,

adhæſion. The middle ligament contains in its duplicature a thick white rope, like a round ligament coming from the navel, which was the umbelical vein in the fœtus.

The right or great lobe of the liver reſts on the right kidney; it likewiſe covers a portion of the arch of the colon, and the pylorus or lower orifice of the ſtomach.

Theſe obſervations are very uſeful, as they aſſiſt us in accounting for many ſymptoms attending its diſeaſes.

It is plentifully ſupplied with arteries, veins, nerves, and lymphatics, for the purpoſes of its œconomy, ſenſation, and nouriſhment. By means of the ſympathetic or intercoſtal nerves, it is connected with almoſt all the contents of the thorax, and abdomen.

The uſe of the liver is very important, being the principal organ for the ſecretion of the bile.

The gall-bladder is a ſmall bag, or receptacle of a pyriforme ſhape, lying in a depreſſion upon the inner or concave part of the liver, towards the back, and verging a little towards the right ſide. From this cyſt a ſmall duct or canal is ſent off, called the *ductus cyſticus*, which being joined in its paſſage by another of the ſame kind, called the *ductus hepaticus*, as coming from the liver, forms the *ductus communis chelodochus*, which, after running a certain length, opens into the cavity of the inteſtines, a little below the lower orifice of the ſtomach.

The bile being ſeperated from the maſs of blood by the liver, is partly lodged in the gall-bladder as a reſervoir, and partly runs through the hepatic duct in an uninterrupted ſtream into the inteſtines.

ON THE NATURE AND PROPERTIES OF THE BILE.

THE bile is a ſaponaceous fluid, of a deep or greeniſh yellow colour, a ſweetiſh bitter taſte, and is diffuſible in water.

In its natural ſtate it does not putrify more readily than the blood, but if diluted with watery fluids, it putrifies more readily. When putrid, the fœtor is not near ſo offenſive as the ſtench of putrid fleſh or blood; but ſomething like ſtinking olive oil.

In its healthy ſtate, it ſhews no tendency to acidity or alcaleſcency, but is in that reſpect perfectly neutral.

Alcalies have a tendency to diſſolve the bile, rendering it very acrimonious and ſtimulating.

It is decompoſed by acids, for being mixed therewith, a reſinous matter is precipitated from it, having the peculiar ſmell of the animal, melting in a moderate degree of heat, inſoluble in water, but is partly diſſolved in ardent ſpirits. *Vid. Fordyce's elements.*

When putrid, it ſhows but little of an alcaline nature; but if it be ſubmitted in this ſtate to diſtillation, a volatile ſpirit may be drawn from it, of the alcaline claſs. *Vid. Macbride's experiments.*

We are however certain, that the bile is capable of contracting a putrid diſpoſition, even in the body.

Sir John Pringle took a quantity of bile from the body of a gentleman 36 years of age, who died of a dropſey, following an obſtinate jaundice. He divided it into three portions; to one he added fixed alcaline ſalt; but this occaſioned no change in the colour, which was a dark green. Into another he dropped ſome ſpirit of vitriol; into the third, common vinegar; and obſerved in both theſe a manifeſt efferveſcence, with a change of the colour to a light green.

The bile has a power in ſome degree, of diſſolving mucilaginous and reſinous ſubſtances; but by what I have been able to obſerve, its action in this caſe is limited.

The bile is in ſtrictneſs of two kinds, hepatic and cyſtic; the former is thinner, of a more dilute yellow colour, and leſs bitter; the cyſtic bile is more elaborated, of a thicker conſiſtence, a deeper colour, and very bitter. But this being only the effect of abſorption, and as they mix together in the common duct before they enter the inteſtines, they are in a medical view to be conſidered as one and the ſame fluid.

It is a very thin and dilute fluid when ſecreted, but acquires a greater conſiſtence by lying in the gall-bladder, from the abſorption of its more fluid part.

All vegetable bitters have a power of correcting acidity; the bile, or animal bitter, is found by Dr Pringle to poſſeſs the ſame quality.

As I imagine that conſiderable uſe may be drawn from this obſervation, regarding the theory and method of cure in many obſtinate diſorders of the organs of digeſtion; a ſhort degreſſion upon the nature of that animal proceſs, may not be improper.

All animal and vegetable ſubſtances when bereaved of life, run into ſpontaneous fermentation, by which means their ſeveral component principles are ſeperated, new combinations are formed, and fly off, leaving nothing at laſt but common earth, the ultimate baſis of all ſublunary bodies.

This fermentation is divided into three ſtages, from three remarkable phænomena attending the proceſs: The vinous; the acetous; and putrefactive fermentation.

We ſhall inſtance this in the fermentation of vegetables. The firſt ſtage is called the vinous, a vinous liquor and ardent ſpirits being generated; to this ſucceeds the acetous, the liquor being now ſour and called vinegar; at length the putrefactive comes on, and the whole becomes thick, putrid, and ſtinking.

Animal ſubſtances, run into the putrid fermentation with great rapidity; there is no doubt but that they undergo the vinous and acetous ones, but theſe are ſo quickly diſpatched as moſtly to eſcape our notice; though we are told by travellers, that the Tartars of Siberia have a method of obtaining an inebriating ſpirit from milk.

During fermentation, a great quantity of air is detached, and flies off from the fermenting body; this is not the ſame with our common atmoſpherical air, but differs from it in many reſpects.

It is to be remarked, that it is the peculiar property of all ferments to aſſimilate all other fluids capable of fermentation, to their own nature.—Thus, a little yeaſt ſoon induces the vinous fermentation in any given quantity of freſh wort, &c. a little vinegar turns the whole ſour; and a ſmall quantity of putrid matter by bringing on the laſt ſtage, ſoon makes the whole offenſive.

But it is in the power of art to obviate theſe different ſtages of fermentation for a time, by the addition of bitters, which powerfully check this proceſs; thus the acetous fermentation in malt liquors, is prevented by the addition of hops.

The degeſtion of the aliment in the ſtomach, is univerſally allowed to be a real fermentatory proceſs, during which, all the different ſtages are in ſome degree gone through.

Sir John Pringle found by experiments, that the bile, though it accelerated the vinous fermentation, yet it agreed with the vegetable bitters in correcting acidity; for, ſays he, "I "took notice, that though the bilious "mixtures loſt the uſual rankneſs, ac"quired in the beginning of the fer"mentation, yet they never ſmelled "or taſted ſour after it was over."

Hence it appears, that the bile has the ſingular property of promoting the vinous fermentation, though it reſtrains at the ſame time the acetous and putrefactive ones.

Vegetable bitters have a very different effect, as they impede all the three ſtages of fermentation; for which reaſon, when given improperly, muſt hurt the digeſtion of our food. This ſeems to point out the reaſon, why vegetable bitters when given in caſes of interrupted excretions of the bile, in order to ſupply its place, are not found to anſwer.

I am ſo well aſſured of the importance of theſe remarks, towards thoroughly underſtanding the theory and cure of diſeaſes of the ſtomach and bowels in general, and in particular the ſymptoms attending the diſeaſe which is the ſubject of this eſſay, that I truſt no one will think the digreſſion needs an apology.

The USE of the BILE.

THE bile was anciently thought to be a fluid meerly excrementitious, a noxious humour ſeperated like the urine from the maſs of blood, for the preſervation of the body in health.

But a more enlarged knowledge of the ſtructure of the body in its healthful ſtate, as alſo of the changes induced therein by diſeaſes; a diligent and attentive inquiry into the alterations which take place in conſequence of the paſſage of the bile into the inteſtines, being either impeded, or totally intercepted, ſhew that fluid to be of great conſequence to the well being of the body, and of very important uſe in the animal œconomy.

The uſe generally attributed to the bile, as being the moſt obvious, is in mixing together the oily and watery parts of the food by its ſaponaceous quality; as being a powerful ſolvent of the more fibrous and ſolid part of the aliment, and by that means rendering it a ſmooth and homogeneous fluid.

If we conſider the changes that take place in the bowels, when they are deprived of the ſalutary influence of the bile, its more important uſes ſeem to be.

1. A conſtant ſtimulus, peculiarly adapted to the bowels, in order to keep up their periſtaltic motion. Coſtiveneſs is a conſtant attendant of an impeded excretion of the bile.

2. An Antizeumac, or checker of fermentation, a fluid provided by na-

ture to retard the acetous and putrid ſtages from taking place too ſoon. When the paſſage of the bile into the bowels is interrupted, the alimentary canal is always oppreſſed with flatulencies, and eructations, heart-burn, &c. ſymptoms of a prevailing acid; from this cauſe in a great meaſure proceed the diſeaſes to which infants are liable, their bile being very thin and inert.

DISEASES OF THE BILE.

BY what has been ſaid above of the nature and properties of this fluid, as alſo its uſe in the animal œconomy, it ſeems that the firſt ſigns of its being diſeaſed, will appear in the organs of digeſtion. Hence, in diſorders of the ſtomach and bowels, we ought always to have ſome attention towards the uſe and condition of this important fluid.

The bile may be diſordered many ways, either in quantity or quality.

When

Exceſs

When it is ſecreted or excreted in too plentiful a manner, but ſtill retaining its healthful qualities, it ſeldom occaſions great uneaſineſs; but goes off in a ſpontaneous bilious dirrhœa.

Deficiency

It may be ſecreted too ſparingly for the purpoſes of the œconomy; this will be the cauſe of many obſtinate diſeaſes, with all the conſequences of an imperfect chylopoœſis.

Vitiation

It is deceaſed in quality, chiefly by contracting a dangerous acrimony, either acid, alcaline, or putrid. The conſequences of theſe morbid conditions of the bile are eaſily underſtood, if we have a juſt idea of its nature, properties, and uſe in an healthy ſtate.

Acid Tendency

The ſymptoms of an acid tendency in the bile, are flatulencies, acidities, crudities in the firſt paſſages, looſe ſtools of a pale yellow colour, or greeniſh with a ſouriſh ſmell; cardialgia, voracious appetite, ſpaſms, an imperfect aſſimilation of the chyle; hence, a thin poor watery blood, acid ſweats, the blood being in this ſtate incapable of properly ſtimulating the animal ſolids, gives riſe to obſtructions, ſtagnations of the fluids in their veſſels, cachexies, dropſies, &c.

It may be indeed diſputed whether the bile can become aceſcent, for theſe ſymptoms equally attend its too weak or inert ſtate.

The prædiſpoſing and occaſional cauſes to this diſeaſe, are, 1. A natural weakneſs, or debility of the ſyſtem in general. 2. Too ſedentary a way of life. 3. Too glutinous and inert aliment; as fiſh, fat and mucilaginous meats, eſpecially boiled. 4. The abuſe of vegetable diet, and fermented liquors; as wines, and thoſe from malt; all thoſe readily run into fermentation in the ſtomach. 5. An exceſſive uſe of acids; this, many young ladies have ſadly experienced, and loſt their health in the purſuit of a fine ſhape. 6. Every cauſe, capable of weakening or relaxing the tone of the ſtomach in particular.

Hence, the method of cure ſpontaneouſly ariſes; which is to be attempted by a diet and medicines that are ſtimulant, ſtrengthening, contrary to acid, impeding fermentation.

The diet ſhould be chiefly ſolid, conſiſting of roaſted, fryed, broiled, and ſalted fleſh meats, eſpecially ſuch as contain much eſſential oil, as wild fowl of all kinds. The drink chiefly ſpirituous, of rum or brandy properly diluted. Abſtinence from vegetables and acids. A diligent obſervance of proper exerciſe.

Alcalescency

Directly contrary to this ſtate, is that in which the bile has contracted an alcaleſcent acrimony; in which caſe it is rendered very acrid, pungent, and irritating.

The ſymptoms which indicate ſuch a condition of the bile, are conſtant thirſt; ſenſe of heat in the ſtomach, bowels, and other parts of the body; nidoroſe eructations; fœtid breath; a bitter, or ſulphureous taſte in the mouth; loſs of appetite; nauſea, and reachings to vomit; evacuations upwards and downwards of a dark coloured, or very yellow, thin, and frothy bile, very fœtid and offenſive; colic pains; the white part of the eyes have a yellowiſh caſt, and the urine is ſmall in quantity, and very high coloured. The body waſtes away by ſlow degrees, the healthy ſuffuſion of red in the ſkin being vaniſhed. Eryſipelatoſe, and other kinds of inflammations, and violent fevers of the putrid claſs, are the conſequences of its continuance.

Its prædiſpoſing and occaſional cauſes are, 1*ſt*. A naturally robuſt and bilious temperament of the body. 2*d*. A too conſtant uſe of animal food; eſpecially when roaſted, high ſeaſoned, and kept ſo long as to verge upon putrefaction. 3*d*. A neglect of vegetable diet, farinaceous food, and acids. 4*th*. A conſtant drinking of ſpirituous liquors, as they are incapable of fermentation in their own nature, and univerſally impede that proceſs in other bodies.

The cure is performed by medicines counteracting putrefaction, and ſuch as obviate the putrid acrimony. By mild and demulcent food, eſpecially white meats, chiefly boiled, and broths made from them. A milk, and vegetable diet; here we include the uſe of recent vegetables, as ſallads, and all kind of fruits. The drink muſt be of fermented liquors, and not ſparing, as wines, malt liquors, cyder, perry, &c. of the wines, our domeſtic ones are to be preferred, becauſe they contain leſs ſpirit, and more fermentable matter than the foreign ones. To theſe muſt be added, reſt of body, and ſometimes the uſe of the warm bath.

A real putrid ſtate of the bile is ſeldom to be obſerved, and muſt be incompatible with animal life.

Putridity

The bile may alſo offend in its degree of ſpiſſitude or conſiſtence. It may be excreted in two thin a ſtate; to which two cauſes chiefly contribute.

Spissitude
[illegible]

1. A too watery and aceſcent diet, by which it is greatly diluted, or its texture in ſome degree deſtroyed. In this caſe, the ſymptoms and method of cure, have a near connection with what has been ſaid in treating of the aceſcency of the bile.

2. A morbid, or too great irritability of the ſyſtem in general, or biliary paſſages in particular; by which means the bile is thrown off too ſoon, before it hath had time to contract a proper degree of conſiſtence by the abſorption of its more fluid part.

This is frequently the caſe in fevers, in which there are great evacuations of bile upwards and downwards. The cure is effected by ſmooth demulcent diet, anodynes, and medicines which have a power of diminiſhing irritability.

Pitchy

The bile may, on the other hand, contract too great a conſiſtence in its paſſages. It has at times been found nearly reſembling pitch.

This proceeds from every cauſe capable of ſtopping up its paſſage into the inteſtines; ſo that by its delay in the gall-bladder, it loſes its fluid partly by abſorption. The cure of this diſorder of the bile varies according to its cauſe, but as it is in ſome meaſure allied to biliary calculi, we ſhall ſay no more of it in this place.

Jaundice

The jaundice is not in ſtrictneſs, a diſeaſe of the bile, but a conſequence of it only. For which reaſon, we ſhall only treat of it in a general manner, as far as is neceſſary for underſtanding what may follow hereafter.

When the bile regurgitates, and is thrown back again into the maſs of blood, in conſequence of its excretion or paſſage into the inteſtines being impeded or ſtopt, the diſeaſe is called a jaundice.

The cauſes that may ſtop the excretion of the bile, and thus be occaſional cauſes of a jaundice, are manifold.

Cauſes of
stopping of
excretion

1. The bile may become too viſcid to paſs through the ducts; but this is not very frequent, nor will it laſt long.

2. Concretions, or collections of hard fœces in the duodenum, may ſtop up the orifice of the duct, but this will be only tranſient.

3. Spaſms of the ducts themſelves; as being muſcular and nervous parts, and endowed with great ſenſibility. Thus we are told of ſudden jaundices from violent fits of anger, as alſo happening to people ſubject to hyſterical and hypochondriacal affections. To this Dr Mead attributes the yellowneſs of the body in conſequence of the bite of a viper; but this ſeems rather to proceed from a putrid diſſolution of the blood, induced by the ſeptic nature of that poiſon.

4. Compreſſion of the ducts by ſwellings, inflammations, and ſchirrous affections of the parts adjacent; as the liver, the glands about the upper part of the duodenum, pancreas, &c. Theſe are for the moſt part incurable, but

happen rarely. 5. A contraction, or adhæſion of the ſides of the ducts together; this is an incurable caſe, but very uncommon, Dr Monro never ſaw it but once.

6. Biliary calculi, or gall-ſtones in the bladder, or common duct; this is the moſt common cauſe of all others, and allowed to be the caſe at leaſt nine times out of ten. We are to obſerve, that when the ſtones are in the gall-bladder, or cyſtic duct, the patient may have no jaundice, becauſe a quantity of bile is always paſſing through the hepatic duct into the bowels; but when they are in the common duct, formed by the junction of the two former, a jaundice muſt follow, as neither the cyſtic or hepatic bile can paſs into the inteſtines.

Hence we may ſee, that a jaundice is incurable in its own nature in ſome rare and uncommon caſes; which ſhews the preſumption and folly of thoſe who pretend to univerſal remedies.

Having now premiſed what was thought neceſſary for underſtanding the chief ſubject of this eſſay, we ſhall proceed to it without delay.

UPON THE NATURE AND COMPOSITION OF BILIARY CALCULI.

BILIARY CALCULI, or gall-ſtones, are not as is generally imagined, meer inſpiſſated bile, or a fortuitous concretion or coagulation of its more groſs and dreggy parts; but curious and regularly formed compound bodies.

They are compoſed for the moſt part, of various concentric coats or layers, formed round a nucleus or center; the layers are frequently of various colours, green, red, black, or yellow, the nucleus is uſually black. If one of them be divided in the middle and poliſhed, the different coloured coats make a beautiful appearance. Sometimes they are found to ſhoot in the form of radii, their nucleus being the center; but this is not very frequent. When the ſtone is formed of ſeveral ſmall ones adhering together, every one of the laſt has its own proper center; in this they reſemble the urinary, and other kinds of animal calculi.

Their ſurface is generally of a brown colour, ſometimes black, reſembling jet; at others, though leſs frequent, of a white colour. Heiſter took one out of the gall-bladder of a woman, of the ſize of a wall-nut, of a reddiſh yellow colour, reſembling a piece of gamboge.

They differ very much in their degree of conſiſtency. Some of them being ſo ſoft as to yield to an impreſſion made with the fingers; in general you may cruſh them to pieces with a moderate force, but are ſometimes ſo ſolid as to require a ſmart ſtroke of a hammer to break them. Regarding their texture, they are generally ſo ſoft, that you may eaſily ſhave them with a knife, like a piece of hard Venice ſoap, they have now and then been obſerved ſo hard as to reſemble marble, but are moſtly friable and brittle.

They are for the moſt part of ſmall ſpecific gravity when compared with their bulk; moſt of them ſwim in water,

ter, ſome on the contrary immediately ſink when put therein.

Their ſurfaces are uſually very ſmooth, and as if poliſhed; this is more particularly the caſe when ſeveral are contained together in the gall-bladder, as by their mutual friction they poliſh each other. Sometimes they are ſcabrous and rough, eſpecially when ſolitary. Their ſurfaces have frequently a granulated appearance, and have at times been covered over with beautiful ſparkling particles like chryſtallized ſalts. We have an inſtance in the philoſophical tranſactions, of one curiouſly incruſted over with chryſtals of various figures, conical, cubical, pyramidal.

They vary much in their figures; being for the moſt part more or leſs angular, or approaching to the cuboide form. This is undoubtedly occaſioned by their mutual preſſure upon each other, and almoſt infallibly ſhews them to be numerous. When they are of a perfectly round, or oval ſhape, without dint or impreſſion upon their ſurface, they are generally ſolitary.

They are alſo found of very different ſizes, ſome like large pin-heads, the common ſize is from a pea to a large hazel-nut; but they have been frequently found as large as pidgeons eggs. There have been caſes, where one ſingle ſtone has filled the whole gall-bladder.

Their number is no leſs uncertain in different ſubjects, being found from one calculus to ſome hundreds in one ſingle patient. Sometimes one large gall-ſtone is found compoſed of ſeveral ſmall ones cohering very faſt together. Dr Oliver took one of a pyriform ſhape out of the gall-bladder of an old lady, which was compoſed of above a hundred ſmall ſtones, of various irregular figures, each having cavities in which they received the convexities of their neighbours, and *vice verſâ*.

They generally melt and inflame very readily in the fire, or flame of a candle, leaving a ſmall quantity of calx behind; others do not ſo eaſily inflame, but rather melt like wax.

SYMPTOMS OF STONES IN THE GALL-BLADDER, AND DUCTS.

WE ſhall endeavour in this account to begin as early as poſſible in the diſeaſe, and enumerate the ſymptoms attending biliary concretions in their ſtate of formation, when they firſt begin to diſturb the functions of the body.

In order to explain this more fully, I have divided the ſymptoms into three different ſtages, the firſt, ſecond, and third, or laſt ſtage; as they differ much from each other, and in ſome caſes require different methods of treatment in the curative part. In the firſt ſtage of the diſeaſe, I ſuppoſe the ſtones to be only forming. In the ſecond, they are perfectly formed, but ſtill in the bladder. In the laſt, they are forcing a paſſage through the biliary-ducts, into the bowels.

The ſymptoms will differ and be more or leſs diſtreſſing, according to the conſtitution of the patient; the greater or leſs irritability of his ſyſtem. The number or ſize of the ſtones, their ſhape, gravity, roughneſs, ſituation in the bladder or ducts, &c.

It can hardly be expected that ſtones in the gall-bladder, can ever become ſo far the object of the ſenſes, as to become manifeſt to the touch. Yet Lentilius, phyſician to the Duke of Wurtenburgh, mentions a caſe in which the gall-bladder was ſo diſtended with them as to cauſe a manifeſt tumour externally on the right ſide, below the cartilages of the ribs, juſt in that part where the gall-bladder is ſituated. And Monſieur Petit ſays, the ſtones may be felt externally in ſome caſes, in patients that are lean, when they are either very large or numerous. But ſuch inſtances are very rare.

first attack

The ſigns of the firſt attack of this diſeaſe are rather obſcure, and generally attributed to ſome very different cauſe; the ſtomach and bowels are uſually the firſt parts that ſuffer, when there is neither pain, or any other more obvious ſymptom to lead to the ſuppoſition of gall-ſtones.

The ſymptoms of the firſt ſtage are, loſs of appetite, an unuſual ſenſation of faintneſs at the ſtomach, eſpecially when faſting, or if they have not more frequent repaſts than uſual in perfect health. Rumbling of wind in the ſtomach and bowels; ſour, ſometimes nidoroſe eructations; ſudden diſlikes to particular kinds of food; heart-burn; palpitations of the heart; lowneſs of ſpirits; tremors; and the whole train of ſymptoms generally called nervous.

Nor, ſhall we be much ſurprized at this, when we duly conſider that the ſtomach and whole alimentary canal, is endowed with greater ſenſibility and irritability than almoſt any other part of the ſyſtem. That it is more ſenſibly affected by irritation of other parts of the body than any, except perhaps the ſenſorium. It is well known that the gout, though in the extremities, has a great conſent with the alimentary canal, and is generally produced by ſome affection of it; many people know the approach of a gouty fit by ſymptoms ſimilar to thoſe above mentioned. A fit of the ſtone in the kidneys or ureters is frequently preceded by, always attended with ſimilar diſorders of the ſtomach and bowels.

Hence it is no wonder that theſe parts ſhould ſuffer very early, in conſequence of an irritation of the biliary paſſages; as they are ſituated almoſt in contact with each other, and ſympathize together by connection of parts.

The ſymptoms of this ſtage ariſe, partly from a ſpaſmodic affection of the ſtomach and bowels, the conſequence of irritation in the biliary paſſages; and in part, from a diſeaſed ſtate of the bile, by which digeſtion is not properly performed. They will be generally eſteemed hyſterical, and as they give not much light into the primary diſeaſe, we ſhall preceed to the ſecond ſtage, in which it is more evident.

Second Stage
Pain

The patient now complains of heavy, ſeldom acute, yet very fainting pain, in the region of the liver, for the moſt part exactly under the pit of the ſtomach, but deep ſeated; and of a ſenſation as if a chord was fixed from that part to the navel, and forcibly ſtretched. The pain generally ſtrikes up as from a center, to the ſpine exactly betwixt the ſcapulæ; ſometimes down to the right kidney, and to all parts in vicinity with it.

The pain has always its remiſſions, and generally intermits. In which laſt caſe, the patient can frequently foretell the fit by an odd kind of rotatory ſenſation about the pit of the ſtomach, not eaſily deſcribed. It is always attended with a convulſive contraction of the bowels towards the affected part; with flatulencies, to ſo remarkable a degree, that the patient refers the greateſt part of his ſufferings to that ſymptom alone; eructations, Borborygmi, and intolerable faintneſs.

When the pain has compleat intermiſſions, it has a ſurprizing tendency to return at certain regular periods; frequently once every twenty-four hours. I knew one caſe, where the pain came on for ſome time together about eight in the evening; in another patient, about ten at night; in a third, at two in the afternoon. But they frequently have ſmart returns of pain at other times, though of ſhort continuance, compared with the chief fit.

Posture

The patient, when in the fit, is inceſſantly changing poſtures, in hopes of ſome degree of eaſe; and generally finds moſt relief when ſitting in a ſtooping poſture with his knees raiſed, which he embraces. In this poſition the belly becomes pendulous, by which the weight of the liver, and other adjacent viſcera, is in part taken off from the gall-bladder.

Anxiety

The patient has great anxiety about the præcordia, cardialgic anguiſh, great acidities in the ſtomach, nauſea; reachings to vomit, eſpecially in a morning when the ſtomach is empty; if any thing is brought up, it is generally little in quantity, ſour or frothy, ſometimes mixed with a ſmall portion of bile. The body is for the moſt part coſtive, with whitiſh clay coloured ſtools; ſometimes they are of a deep brown colour. They have frequently a looſe ſtool or two when the fit is over, to which the patient attributes his relief; this ſeems to be meerly the conſequence of the preceeding irritation, and ſhews the abatement of the ſpaſms.

Urine

The urine, during the fit, is moſtly clear and pale; but after it is gone off, high coloured, becoming turbid when cold, with a dilute pinky ſediment. As the diſeaſe advances, it is of a deep flame-colour, turbid when cold, and of a dark chocolate hue, ſometimes nearly approaching to black, with a copious ſediment; and will frequently tinge a linen rag yellow.

The colour of the face is at times very little altered, and the patient often keeps his natural degree of corpulency, in ſo much that it is ſurprizing how healthful the patient is to appearance conſidering his great ſufferings; but if the white part of the eyes be carefully examined, a yellowneſs may generally be perceived therein. But in general the countenance becomes pale, ſallow, yellowiſh, and cachectic; the body gradually waſtes; the eyes appear ſunk in their orbits, with a browniſh circle round them.

The patient has uſually more or leſs pain in the right ſhoulder or arm; a ſymptom common to moſt diſeaſes of the liver. It is generally overlooked by the patient, or atributed to a rheumatic cauſe; but its not yielding to remedies proper in ſuch caſes, ſhews that it derives its origin from a very different ſourſe, and is ſo conſtant an attendant upon ſtones in the gall-bladder, that it will aſſiſt with the concurence of other ſigns, to aſcertain the diſeaſe. Dr Baglivi, in his treatiſe *De bilis naturâ*; gives us an account of a patient of his, who was afflicted with moſt violent pains in his right arm for upwards of a year before his death; his body being afterwards opened; no diſeaſe appeared, except that two large ſtones were found in his gall-bladder. His countenance had been for ſeveral years of a pale citron colour, more eſpecially the white part of his eyes, but the pain in his right arm yielded to no kind of remedies. Other inſtances of the ſame kind, are recorded by medical authors.

[illegible]

This ſtage of the diſeaſe ſometimes continues for ſeveral months, or even years; according as it is more or leſs violent. If the patient quits no ſtones, or obtains only temporary relief, his ſtrength at length fails, and being wore out with ſickneſs, pain, and dejection of ſpirits, a dropſy generally cloſes the ſcence of life.

Huldenreichius, in the *Acad. nat. curios.* makes mention of a woman who, for upwards of thirty years, endured ſo much pain, that ſhe imagined ſhe had a viper within her.—Being opened after her death, every part appeared in a healthful ſtate, except that there was found a very large ſtone in the gall-bladder.

Hoffman, *Obſervat. Lib.* xix. gives us the caſe of a man, in whoſe gall-bladder were found ſeveral hundred ſmall calculi. This perſon, for the laſt twenty years of his life, had ſuffered the moſt violent pains, with a ſenſe of great heat about the pit of the ſtomach, and heart-burn.

If the ſtone be ſingle and very large, or compoſed of many ſmall ones adhering together, there can be little hopes of its ever paſſing the duct; the patient muſt conſequently, unleſs a method of diſſolving the ſtone be found, paſs the remaining part of his life with more or leſs of the ſymptoms of the ſecond ſtage. If on the other hand, the ſtones be detatched from each other, ſmall in ſize, and the ducts eaſily dilatable, they endeavour to force their way into the bowels, which is an effort of nature to free the body of the diſorder, and compoſes the third or laſt ſtage.

When we conſider the ſmall diameter of the biliary ducts which the ſtones have to paſs through from the gall-bladder to the inteſtines, their intorted ſhape, the impediments to dilatation from the denſity and firmneſs of their membranous and muſcular coats, the long paſſage of the end of the common duct between the coats of the inteſtine before it opens into it; we are not ſurprized at the extream violence of the ſymptoms attending their paſſage.

There are not wanting inſtances of people paſſing a number of gall-ſtones with very little pain, owing to a favourable combination of circumſtances. Some have paſſed with equal eaſe, ſtones of a conſiderable magnitude from the urinary paſſages, but this is the fortunate condition of few.

The ſymptoms of the third ſtage, or when the ſtone is actually forcing its paſſage through the biliary ducts into the inteſtines, are as follows: The patient is commonly ſeized with a ſudden cold or chilly fit, or ſpaſm of the external ſurface of the body; this ſeldom continues long, but returns very frequently. He complains of a moſt violent and acute pain about the pit of the ſtomach, but deep ſeated, which ſhoots up towards the ſhoulders, and downwards to the ſmall of the back, by which not only the viſcera of the abdomen, but of the thorax too, are violently affected with ſtrictures, and drawn forcibly towards the affected part. The pain is generally attended with extreme ſickneſs, and inceſſant reachings to vomit, by which a ſmall quantity of frothy matter mixed with bile is brought up; yet I have known ſome patients who had neither of theſe ſymptoms, although the pain was ſo violent, that they ſeemed upon the rack. The extremities are quite cold, and a cold ſweat is ſeen like a dew hanging upon the forehead and breaſt. Sometimes they faint by reaſon of the exceſſive torture, and lie for ſome time in a ſtate of inſenſibility; at others, they have convulſive contractions, and a diſpoſition to a dilirium, but of the comatoſe kind, and a jaundice comes on ſuddenly.

They complain of being almoſt burſt with wind; of great faintneſs; difficulty of reſpiration; inexpreſſible anguiſh; and cannot remain one moment in the ſame poſture. The body is generally coſtive, and the urine high coloured, and in ſmall quantity.

In the very worſt of theſe fits, I have been ſurprized to find ſo little alteration in the pulſe, and the ſmall diſpoſition to a fever. The only alteration obſervable is, that the pulſe is ſmaller and more contracted than when in health, and the tongue a little whiteiſh.

Theſe ſymptoms uſually continue with remiſſions until the ſtone is got out of the duct into the inteſtines, and end with great gripings and purging of thin bilious ſtools. The ſkin becomes ſoft and moiſt, the extremities warm, urine lighter coloured, with a white or lateritious ſediment, the pulſe ſoft and full; to which ſucceeds a warm breathing ſweat, and a remiſſion of all the ſymptoms.

But if the pain continues very long, intenſe, and ſharp, the whole nervous ſyſtem is dreadfully affected with convulſive motions, diſtenſion of the limbs and joints, epileptic ſpaſms. If to theſe be joined the ſymptoms of fever, a quick hard pulſe, a very rough and dry tongue with great thirſt, we have too great reaſon to ſuſpect a large, hard and rough ſtone to be firmly fixed in the biliary ducts, which, if it cannot be diſſolved, will ſoon hurry the patient out of the world.

The patient is often ſenſible of the dropping of the ſtone into the bowels; ſometimes they have a ſenſation as if ſomething had broke within them, and as if water was flowing within from the conſequent free paſſage for the bile.

The ſtone being, during the fit, diſcharged out of the ducts into the inteſtines, is evacuated quite out of the body by ſtool. It has happened, that the ſtones have been brought up by vomiting. The learned Dr Huxham,

Vomiting

in a letter to Dr Coe, gives two inſtances of the latter, in the caſes of two gentlewomen who, after ſeveral days inceſſant torment of cholic, vomiting, jaundice, &c. threw up ſeveral gall-ſtones from the ſtomach, and afterwards recovered. They are indeed dreadful caſes, proceeding from the extreme violence of the ſpaſms, by which the natural order and motion of the ſtomach and bowels are reverſed.

The accurate Dr Sydenham ſeems to have had not the leaſt knowledge of this diſeaſe; yet the following account of ſymptoms ſhews us, that he had frequently ſeen it, which he ſuppoſes to be an hyſteric cholic.

" Nonnunquam, (ſays he) in colon,
" et regionem ſcrobiculo cordis ſub-
" tenſam impetum faciens, dolorem
" vix ferendum infligit, iliacæ paſſi-
" oni haud abſimilem; ubi ægra
" immodicè vomit, colluviem quan-
" dam viridem, nunc etiam inſoliti
" alicujus coloris, rejiciens. Sæpe
" etiam poſtquam ægra ad multos
" dies jam dicto dolore (qui vel ſto-
" icorum ἀπάθειαν expugnaret) et con-
" tinuo vomituritionis conatu tan-

"tum non fuerit enecta, tandem "ictero intenſiore omnem corporis "ſuperficiem ad inſtar croci tergente, "ſolvitur paroxyſmus."

And indeed, the following remark gives ſome reaſon to think, that biliary concretions were no leſs common in very remote ages than at this day, but the unfrequency of diſſections, keep them in ignorance as to the cauſe.

"Qui lumborum et lateris dolore "abſque ulla occaſione tentantur, "ii in morbum regium incidunt."—*Hippocratis Coi*, *Coac. Prænot. Sect.* 2.

Having now finiſhed the account of ſymptoms attending ſtones in the gall-bladder; we next proceed to the prædiſpoſing and occaſional cauſes of that diſeaſe.

PRÆDISPOSING CAUSES.

In order to aſcertain this, we muſt be well acquainted with the different ſubſtances of which gall-ſtones are compoſed; and it is by experiments alone, Not mere concretes of bile

alone, that this is to be acquired. Biliary calculi have been generally thought to be meer concretes of coagulated or inſpiſſated bile; but they appear from various experiments made upon them, to be regularly formed compound bodies, conſiſting of a large proportion of a ſaline matter, a quantity of bile, and ſometimes a ſmall portion of earthy matter.

Saline bodies in general, have a very ſtrong attraction to other bodies, readily combining with them, and forming various kinds of compounds.

Hence, I ſuppoſe the cauſe which prædiſpoſes the body to calculous concretions, to be a peculiar idioſyncraſy, or conſtitutional diſpoſition of the fluids of an animal body to form chryſtallizations, or generate a quantity of ſaline matter. In whatever part of the body theſe ſaline particles are generated, being aſſiſted by the concurrence of occaſional cauſes, concretions will be formed; by reaſon of the attraction of the ſaline particles to every kind of matter with which they happen to be in contact.

Thus, the combination of this ſaline matter with the bile, forms gall-ſtones; with the earthy part of the urine, it forms calculi in the urinary paſſages. And this equally takes place in other parts of the body; for ſtones have been found in almoſt every part of the body, in all the viſcera of the abdomen, the lungs, the heart, and even the brain itſelf. Analogous to theſe are the ſtony concretions in the ſalivary ducts, the tartar of the teeth, the grittyneſs obſervable in ſome kind of tumours, and the chalk-ſtones in the gout.

This hypotheſis is greatly ſtrengthned, by obſerving, that few patients have any one of theſe diſorders ſingly, or without ſome of the other being preſent.

Very few labour under biliary calculi, who are not ſubject alſo to ſtones in the urinary paſſages; I never ſaw an exception to this, but I have not had an opportunity of ſeeing a ſufficient number of caſes to eſtabliſh it for a certainty. How frequently the gout and ſtone are joined together in the ſame patient, or rather how inſeparable they are, is ſufficiently known. Hoffman gives us an inſtance of ſtones found in both the biliary and urinary paſſages, of an old man who had been much ſubject to the gout. Many more examples of the ſame kind are to be met withal.

OCCASIONAL CAUSES.

THESE ſeem to be chiefly three, a too ſedentary way of life, paſſions of the mind, errors in diet. Of which we ſhall give a brief account in their proper order.

Want of Exercise

It is the good effect of exerciſe, to encreaſe the tenſion and ſpring of the animal ſolids, by which their action upon the fluids is invigorated. Hence, the circulation of the blood, all the various ſecretions and excretions are carried on in a free and uninterrupted manner; by which the body is ſtrengthened; a free and uniform flow of ſpirits, good appetite, and eaſy digeſtion are the conſequences.

Directly contrary to theſe, are the effects of an idle and too ſedentary life.

The neglect of muſcular motion, by inducing a weakneſs and diminiſhed tenſion of the ſolids, lays a foundation for a number of diſeaſes. The fleſhy or muſcular fibres are rendered torpid and unfit for motion, incapable of propelling forwards their contained fluids with due velocity; hence ſtagnations, inſpiſſations, concretions are formed, the body becomes loaded with fat, or ſwelled with dropſy.

The formation of calculous concretions in the body, neceſſarily preſuppoſes a degree of ſtagnation of the fluids in the affected part; this is abſolutely required to favour their combination. A ſtrong action of the veſſels and conſequent briſk circulation of their encloſed fluids, effectually prevent attractions of this kind from taking place. Thoſe who are in the flower of their age, or uſe ſufficient labour and exerciſe, are generally exempt from all kind of calculous diſorders, gout, &c. This ſeems to be the plain and true reaſon why diſeaſes of this claſs are ſo very frequent among men whoſe incomes put them above the neceſſity of labouring for their bread; but ſeldom ſeen in the more humble walks of life.

Inactivity of body has ſo great a tendency to favour the formation of gall-ſtones, that the learned Baron Van Swieten ranks this diſeaſe among thoſe to which the learned and ſtudious are particularly liable. And very juſtly remarks the compreſſing of the viſcera of the abdomen, by ſitting at their ſtudies in a ſtooping poſture with the ſtomach preſſed againſt a table, or deſk, to be a concurring cauſe. This muſt greatly diſturb the functions of the adjacent viſcera, eſpecially the liver, and impede the circulation and natural motions of their ſeveral fluids, more particularly when done ſoon after meals.

Mental Affections

Paſſions of the mind produce very ſenſible effects in the body, particularly anger and fear. Theſe generally affect the ſtomach and bowels, and by diſturbing their natural offices in the œconomy hurt digeſtion; hence ariſe aceſcenſy, crudities, a diſordered chylification, obſtructions in the viſcera, and various chronic diſeaſes. Anger is thought to have a particular tendency to affect the biliary paſſages, and produce ſtrictures in the ſtomach and duodenum.

Errors of Diet

Regarding errors of diet, it is unneceſſary to enter upon the ſubject in this place; as we have pretty fully diſcuſſed that point in a former part of this eſſay, treating of the diſeaſes of the bile.

The learned Baron, mentioned above, ſays, that ſpirituous liquors tend to the production of calculi, partly by their coagulating quality, and partly by their heating the body, and thereby diſſipating the thinner parts of the fluids. But by a number of experiments made upon this ſubject, I am led to believe that ardent ſpirits, eſpecially when properly diluted, have a contrary effect.

Acids

Dr Fordyce found by experiment, that acids decompoſe the bile, and precipitate a kind of reſinous matter from it. We are hence led to ſuſpect the prepoſterous uſe of acids, and to conclude them to be at times an occaſional cauſe to this diſeaſe; for if the ſolid parts of the bile be ſeperated from the more fluid, combinations will eaſily form.

All kinds of fermented liquors come under ſome ſuſpicion, as giving off a great quantity of fixt air, which ſeems to be the vinculum, or bond of union in calculous concretions. Wines alſo contain in themſelves a great quantity of ſaline tartarous matter, the roughneſs and aſtringency of the red kinds are to be ſuſpected.

It may not be amiſs in this place to remark, that the prædiſpoſing and occaſional cauſes of diſeaſes cannot produce any effect ſeparately, but muſt be combined together; this diſtinction is of great conſequence in practice, too ſeldom attended to, or confuſedly jumbled together. We ſhall inſtance this in the gout, a diſeaſe in which inattention to this point has cauſed much confuſion, and even contradiction among medical writers. The prediſpoſing cauſe to which diſeaſe is unknown as to its nature, but is certainly interwoven with the original ſtamina of gouty bodies, an hereditary diſpoſition communicated from the parent to the offſpring, but can never appear in the form of a diſeaſe, till rouſed up into action by the aſſiſtance of occaſional cauſes; thus the ſeed of a vegetable contains in embryo the rudiments of the future plant, but in order for vegetation, moiſture and a proper pabulum it required, if the ſeed be denied this aſſiſtance no plant is formed. So it is often in the power of art by avoiding of occaſional cauſes to prevent what is called the gout, but the cauſes which prediſpoſe the body to this diſeaſe will ſtill remain latent in the habit.

Having treated, and that pretty fully, of the nature of gall-ſtones, their ſymptoms and cauſes, we next proceed to the curative part.

METHOD OF CURE.

STONES in the gall-bladder are a diſeaſe which has been generally eſteemed incurable.

The excellent Baglivi is very poſitive in his prognoſtic: "Quare cum "icteros videris pertinaces, vel ſanatos ſed recidivantes, pro certo habeas, eos a calculo veſicæ felleæ

“ progigni, ac proinde incurabiles “ prædicito, quod cadaverum ſectiones te docebunt.” *Tract. de bilis naturâ.*

Riverius, who was phyſician to the French King, ſays, “ Calculus, cum “ diſſolvi non poſſit, morbum facit “ incurabilem.” *Cap. de ictero.*

Sylvius de la Boe, expreſſes himſelf in this manner: “ Cum difficile ſit “ calculos ex bile ortos dignoſcere, “ non mirum ſi eorundem curatio res “ inaudita videatur multis medicis.” *Prax. med. lib.* i.

Dr Coe, and other phyſicians, have not diſpaired of curing this dreadful diſorder; but place all their hopes in endeavouring to force their paſſage through the biliary ducts into the inteſtines. This is always uncertain and dangerous, generally impracticable.

It is therefore ſurprizing, that practitioners have not attempted to diſſolve them whilſt in the body. Solvents are univerſally given in caſes of urinary calculi; ſtones in the gall-bladder are perhaps as frequent a diſeaſe, generally more painful, always more dangerous to life.

I have however ſome reaſon to believe, that they may be eaſily diſſolved when in the body; for in the courſe of a ſeries of experiments made upon them out of the body, I found out a method of effecting it with great eaſe and rapidity. I have only had an opportunity of reducing it to practice in one caſe, but with a happy effect, but if I have the ſatisfaction of finding it anſwer upon further trials, it will give me great pleaſure to make it known.

A gentleman of rank, between fifty and ſixty years of age, after being in an active ſphere of life, and for many years expoſed to the influence of different climates, too ſuddenly took to a ſedentary way of living. This gradually brought on a declining ſtate of health, and for the laſt nine months, he laboured under many of the ſevereſt ſymptoms of the ſecond ſtage of this diſorder. The fit was exceeding violent, continuing ſeveral hours, and came on with much regularity about eight in the evening. He had indeed frequent attacks at uncertain times between whiles, which, though pretty ſevere, were ſhort and tranſient if compared with the other. All means were tried that ſkill and prudence could ſuggeſt, notwithſtanding which he grew daily worſe, opiates being the only remedies which procured any conſiderable relief.—Chancing to mention to him the reſult of my experiments, he was very preſſing that I would try its effects in his caſe, which was at length conſented to. On the third day after, beginning the uſe of the medicine, his urine from a ſaturated blackiſh brown colour became more natural, depoſiting when cold a pinky, and at length a lateritious ſediment. This gave me great hopes, notwithſtanding his pain and other ſymptoms continuing as before. The fits were much diminiſhed both as to violence and duration in a few days after this, and in a fortnight quite gone off; a ſudden bilious diarrhœa came on and laſted two or three days, which was tinged with blood, though without the leaſt pain. This was undoubtedly cauſed by the diſcharge of the bile, the ducts being now open and pervious; ſince this he has never required the aſſiſtance of an opening medicine, which he had been before long neceſſitated to uſe. It is now upwards of two months ſince his fits ceaſed, is in better health than for ſome years laſt paſt, is able to uſe a great deal of excerciſe, and ſeems in every reſpect cured.

The medicine never diſagreed in the leaſt with the patient; but on the contrary cauſed a ſenſe of warmth in the ſtomach, which was very agreeable, and diffuſed itſelf to the extremities, which, during the courſe of the diſeaſe, were always colder than when in perfect health.

If the ſtones cannot be diſſolved, the method of cure conſiſts in endeavouring to diſlodge them by mechanical action; at the ſame time palliating the violence of the ſymptoms.

The ſymptoms of the firſt ſtage give but little inſight into the nature of the primary diſeaſe, being chiefly what are called nervous, and will be generally treated as ſuch.

But a perfect knowledge of the nature of the bile and its important uſes in the animal œconomy, will lead us to ſuſpect by ſuch ſigns of a diſordered digeſtion, ſome fault in that fluid.—

If to theſe be joined a yellow tinge in the white part of the eyes, or ſallow caſt in the complexion, the diſorder is more evident.

The ſymptoms of this ſtage are obviated by aromatics, bitters, antiacids, opening medicines, and ſuitable diet. Their effects are eaſily underſtood, from what has been ſaid about the nature and uſe of the bile, in a former part of this eſſay.

But if there be great reaſon to ſuſpect the primary diſorder to be calculous concretions in the gall-bladder, there is reaſon to hope that they may now be eaſily brought away before they have acquired any conſiderable ſize, or ſolidity.

This intention is frequently anſwered by emetics and purgative medicines, repeated as often as occaſion may require, and the patient be able to bear them. Theſe, eſpecially the former, by the ſhock they give to the ſyſtem in general, and more particularly to the biliary paſſages from their vicinity, cannot but be of great uſe towards diſlodging and forwarding the exit of gall-ſtones.

The uſe of exerciſe, eſpecially upon horſeback, muſt not be neglected during this ſtage of the diſeaſe. As the gentle concuſſions it gives to the body, will greatly help to prevent further concretions, by cauſing a briſk motion of the fluids, as well as aſſiſt their expulſion when formed.

When the diſeaſe has arrived at its ſecond ſtage, it becomes much more obvious, and can ſcarcely be miſunderſtood by practitioners of knowledge and experience.

Here vomits are exceedingly uſeful; for if they fail of diſlodging the gall-ſtones, they frequently bring up a great quantity of viſcid phlegm and other impurities, to the relief of the patient. But they are now frequently impracticable from the pain they occaſion; for as the ſtones are probably large and compleatly formed, the action of vomiting cauſes too great friction of them againſt the tender coats of the gall-bladder, and puſhes them forward with too great violence into the orifice of the duct, as yet narrow and undilated. For the ſame reaſon the pain is generally exaſperated by riding, exerciſe, and violent motion of every kind.

The coſtive habit of the patient, calls for the repeated uſe of medicines that ſtimulate the bowels and open the body gently.

The cure of this diſeaſe is generally attempted by alteratives, eſpecially the decoctions of the opening roots, and of the ſaponaceous lacteſcent plants. The Baron Van Swieten greatly recommends a decoction of the above mentioned plants and graſs, in whey; he gives a pint every day for three months together, with the addition of a proper quantity of *ſal polychreſtum*. And ſays, that by a long perſeverance in that courſe, he has known ſome obſtinate caſes cured.

Soap is univerſally uſed in all icteric diſorders, and is certainly well calculated by its detergent quality, to diſſolve many kinds of obſtructions ariſing from a too viſcid ſtate of the humours. But experiments ſhew that it has no power of action upon biliary calculi. It may however be of uſe by way of prevention.

The juice of the triticum repens, or dogs-graſs, has been greatly extolled on account of its efficacy in the cure of this diſeaſe. Which notion probably took its riſe from an obſervation of Sylvius and Boerhaave, that gall-ſtones are always found in the biliary paſſages of cows and oxen in winter, when they chiefly feed upon hay and ſtraw; whereas, in ſummer, when they eat freſh graſs, they are ſeldom met withall.

Millepedes have been much uſed for the ſame intention. But to expect any great advantage from them, they ought to be taken alive, and in conſiderable quantities.

Mercury, and its preparations, are much relied upon in the ſame intention. It is a powerful deobſtruent, but can have no effect upon gall-ſtones, which are not meer thick or inſpiſſated bile, but regular compound ſubſtances, and conſequently not to be decompoſed but by elective attraction.

During the ſymptoms of the third ſtage, or when they are actually forcing their way through the ducts, the method of treatment is in many reſpects very different from that proper in the other two ſtages. Here is no opportunity of giving evacuants or diſſolvents, but the intention muſt now be directed to diminiſh the ſpaſms, and relax the ducts.

The firſt and chief endeavour muſt be to gain a truce by means of opiates. They are abſolutely neceſſary to check the enormous vomitings, to enable the patient to retain other medicines, to abate the exceſſive torture, and in many caſes even to ſupport life itſelf.

The quantity given muſt be according to the urgency of the caſe, beginning with ſmall doſes, and repeating them till a remiſſion of the ſymptoms be obtained. In this diſeaſe as well as other kind of ſpaſms, it is ſurprizing to obſerve how well the patients bear opiates; it is a ſingular providence that the more neceſſity there is for their uſe, the leſs they affect the body when their anodyne effect is over.

It will be of uſe to take away ſome blood, eſpecially if there be ſymptoms of fever, but the operation ſeldom requires a repetition.

Clyſters are of important uſe, not only as they tend to procure ſtools, but as a kind of internal fomentation applied near the parts immediately affected, and thus help to diminiſh the ſpaſms, and relax the biliary ducts.

Neither are we to forget topical applications. As hot flannels, or a bladder filled with warm water applied as hot as the patient can bear, upon the pit of the ſtomach, and the region of the liver; to theſe are to be added warm fomentations of emollient herbs. A large earthen jar filled with hot water, wrapped up in flannel, and placed at the bottom of the bed, ſo that the patient may lay with his feet againſt it, has given temporary relief, and will keep warm for ſeveral hours. Sitting for ſome time in a warm bath, is of great ſervice.

By ſuch a procedure, the fit is rendered more tolerable, and of ſhorter duration. The ſigns which indicate its going off are, the pulſe from hard and contracted becomes ſofter and fuller, the ſurface and extreme parts begin to have a ſenſible warmth, at length a univerſal refreſhing ſweat comes on with a remiſſion of all the ſymptoms.

After this ſtorm is over, we have an opportunity of trying to diſſolve them, if there be reaſon to ſuſpect the ſtones to remain ſtill behind.

When the ſtones have got out of the biliary paſſages, or are diſſolved, the convaleſcents muſt be very careful to guard againſt a relapſe; which is done by a diligent attention to what has been ſaid of the occaſional cauſes.

As the biliary ducts, and firſt paſſages, in conſequence of conſent and vicinity, will remain for ſome time diſordered, ſore, weak, and too irritable; we muſt endeavour to ſtrengthen them by proper tonic and ſtomachic medicines. In this intention, ſome kind of mineral waters are of important uſe; as thoſe of Spaa. Dr Brockleſby, in the London Medical Eſſays, gives ſome remarkable inſtances of the good effects of Seltzer water as a corroborant.—Dr Hunter gives us reaſon to expect the ſame advantages from thoſe of our iſland, *Vid.* his treatiſe on the nature and virtues of Buxton waters. Where the circumſtances of the patient admit of it, I would by all means adviſe his going to Bath.

Regarding the diet neceſſary to be obſerved by the ſick, the dictates of nature ought to be obſerved; the food for which the patient has the greateſt deſire and craving will generally agree the beſt, though not always agreeable with the rules of art. It may however be remarked, that they uſually require nouriſhment of the ſolid and ſtimulating kind, as fleſh meats, eſpecially roaſt, fryed, or broiled. Vegetables and acids ſhould be avoided, at leaſt uſed ſparingly; as they are now more liable to produce flatulencies and acidities in the ſtomach and bowels, through want of a ſufficient proportion of bile to correct them. The ſame objections are to wines, and malt liquors, &c. Rum, or brandy, properly diluted, ſeem to be the proper liquors, being not liable to ſuch accidents.

But above all, I would inforce the uſe of exerciſe. Walking or riding on horſeback claim the firſt place, eſpecially the latter, where it agrees with the patient. Riding in a carriage is only to be uſed when the weakneſs of the patient renders the other two impracticable.

If we conſider the effects of exerciſe, as putting all the various muſcles of the body into motion, the ſpring and action it gives to the ſolids, and the conſequent increaſed momentum of the various circulating fluids; its great tendency to preſerve, as well as reſtore the health of the body, is eaſily underſtood. Its moſt obvious good effect is the preſerving all the minute vaſcular and capillary tubes open and pervious, by which their ſeveral contained fluids circulate through them with eaſe and rapidity, their ſtagnation and conſequent concretions are prevented, all the various ſecretions and excretions are maintained, and the free circulation of the fluids in the extreme cuticular veſſels gives a florid healthy complexion. To ſum up the whole, there is no doubt but that inactivity and intemperance, are not only the occaſional cauſes of gall-ſtones, and all calculous concretions in particular, but of all chronical diſeaſes in general.

THE END.